

The Golden Ratio

This investigation is about you and your face.

You are going to find out just how different people's faces really are.

You are also going to think a little about beauty.

What is it about some faces that makes us call them beautiful?

You are going to look at these measurements:

- the width of your eyes
- the width of the bridge of your nose
- the width of your whole smile
- the width of teeth we can see when you smile



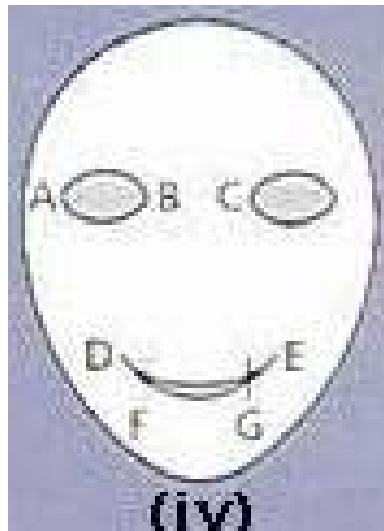
Before you start you will need to decide:

- the best way of taking the measurements
- the best units to use
- how to be safe in your investigation

Measuring your face

Stick a photo of yourself in this space.

It needs to show the front of your face and you should be smiling!



Measure the width of one eye (from A to B on the diagram).

Eye width = _____ mm

Measure the width of the bridge of your nose (B to C).

Bridge width = _____ mm

Measure the width of your mouth when you smile (D to E).

Mouth width = _____ mm

Measure the width of your teeth when you smile (F to G).

Teeth width = _____ mm

Ratios

You are going to work out the ratios between some of your measurements by dividing them. You do this by dividing one measurement by another.

Ratios are a good bit of maths to help us compare different numbers.

You're going to use them for this activity.

You'll learn a lot more about them in your next school.

$$\frac{\text{bridge width}}{\text{eye width}} = \underline{\hspace{2cm}} = \boxed{\hspace{2cm}}$$

$$\frac{\text{mouth width}}{\text{teeth width}} = \underline{\hspace{2cm}} = \boxed{\hspace{2cm}}$$

- Are the two ratios the same as each other?
- Are they close to each other?

Comparing faces

Now you are going to see how your ratios compare with other peoples' in your class.

- Write down all the widths and ratios for ten people in your class.
- Work out the average ratio for these ten people.
(To work out the average add up all ten values and divide the total by ten.)

Name	Bridge width (mm)	Eye width (mm)	Bridge/eye ratio	Mouth width (mm)	Teeth width (mm)	Mouth/teeth ratio
Totals						
Averages						

Comparing faces (2)

- Were the ten ratios for bridge/eyes different from each other?
- Were they very different? If the measurements are not exact then the ratios may be a little different.
- Now look at the mouth/teeth ratios.
What is the average for this ratio?
- Are the two ratios from the same person similar?

The Ancient Greeks knew a lot about these ratios.

The Greeks took lots of measurements of faces, bodies and other parts of living things. They found that the same ratio kept appearing. They called it the Golden Ratio. They thought that if something matched the Golden Ratio this was a way of making sure it looked right.

The Ancient Greeks used the Golden Ratio in the design of some of their buildings.

This idea has been passed on, and there are some famous old buildings where the Golden Ratio was used.

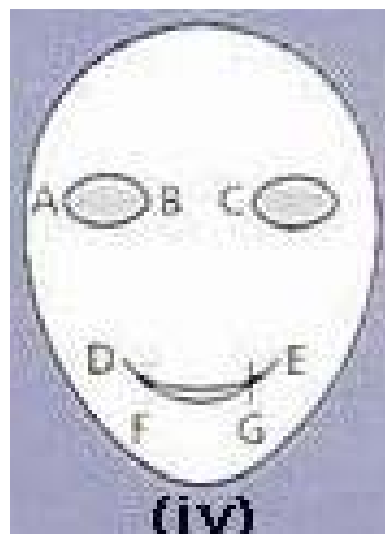


The Parthenon in Athens was built between 447 and 432 BC to hold a huge gold and ivory statue of the Greek goddess Athena.

Comparing faces (3)

You worked out the Golden Ratio for some of your class, but of course this might not be the same for older people.

- Stick a picture of an adult in this space.
- Make the face measurements and write them down in your table.
- Work out the ratios.
- Answer the questions.



Bridge width (mm)	Eye width (mm)	Bridge/eye ratio	Mouth width (mm)	Teeth width (mm)	Mouth/teeth ratio

- Are the two ratios for a face similar?
- Are the ratios similar to those for your class?

Face beautiful?

The Golden Ratio gives us information about an average face, and average faces look very acceptable. But what about strikingly beautiful faces?

How might a very beautiful face vary from an average face in the:

- size of the eyes?
- width of the mouth?
- width of the face?

Think about musicians, TV personalities, sport stars etc.

- Which of them looks really good?
- How could you get a picture of their face?
- Find a picture of a good-looking celebrity. Share with your friends so that you have three faces of good-looking people to measure.
- Fill in the measurements and ratios for your three beautiful faces in the table.
- Answer the questions.

Name	Bridge width (mm)	Eye width (mm)	Bridge/eye ratio	Mouth width (mm)	Teeth width (mm)	Mouth/teeth ratio

- How do the results compare with those for ordinary adults?
- Do beautiful people have a different ratio?

Try and find out how the Greeks used these ideas in the things they built.

For this exercise you will need pictures of classical Greek buildings like the Parthenon.

You could look in books, CDROMs, internet etc.

- On each picture measure height and width of the buildings. Work out the ratio between these numbers. Do you get a Golden Ratio?
- Mark these in on the pictures and make a table of your results.

For example:



Ancient Greek ruins from the Acropolis in Athens. This is where the Parthenon is built.

Now investigate if your school is built to the Golden Ratio proportions.

Your plan needs to make it clear:

- which building you will use
- how you will measure it
- how you will present what you have found